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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/734,863	12/12/2000	Kei Murayama	849-00	4384

7590 08/22/2003

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EXAMINER

KIBLER, VIRGINIA M

ART UNIT	PAPER NUMBER
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2623

DATE MAILED: 08/22/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/734,863

Applicant(s)

MURAYAMA ET AL.

Examiner

Virginia M Kibler

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 December 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

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DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities: "coiling" should be changed to "coining" on page 12, line 20.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 2, 4, and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ichihara (6,133,052) in view of Michael et al. (6,317,513).

Regarding claim 1, Ichihara discloses a bump inspection apparatus for inspecting the shapes of a plurality of bumps (Col. 2, lines 52-57) each having a planar top portion (Col. 6, lines 24-27), on an inspection object, comprising an illumination optical system 17 for illuminating the top portions, an observation portion for observing the images of the top portions in a predetermined range of the inspection object (Col. 6, lines 4-14), a processor unit for analyzing the shapes of the bumps on the basis of the images of the top portions (Col. 7, lines 6-16), and the processor unit including analyzing means for analyzing the area of the planar top portion of each of the bumps Figs. 4A-4E (Col. 7, lines 16-20), and judging means for judging whether or not the area of the top portion falls within a predetermined range (Col. 7, lines 35-43).

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Ichihara discloses an illumination device and an observation optical system, but does not appear to recognize illuminating with a parallel pencil of light vertical thereto through a telecentric optical system. However, Michael et al. ("Michael") teaches that it is known to use a telecentric optical system illuminating an object with a parallel pencil of light with an observation optical system including a telecentric optical system having an optical axis thereof in conformity with that of the illumination optical system (Col. 5, lines 45-47) to inspect solder paste. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the optical system disclosed by Ichihara to include the telecentric optical system taught by Michael because it is well known in the art (Col. 5, lines 45-46).

Regarding claim 2, Ichihara discloses the top portions of all of the bumps exist on the same plane (Col. 5, lines 59-63).

Regarding claim 4, the arguments analogous to those presented above for claim 1 are applicable to claim 4.

Regarding claim 5, the arguments analogous to those presented above for claim 2 are applicable to claim 5.

4. Claims 3 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ichihara (6,133,052) in view of Michael et al. (6,317,513) as applied to claims 1 and 4 above, and further in view of Kyo (JP 10032279).

Regarding claim 3, Ichihara and Michael do not appear to recognize including reflowing the solder to form substantially hemispherical shapes and shaping the bumps by a coining process. However, Kyo teaches that it is known to form bumps into substantially hemispherical shapes by reflowing the solder (Abstract, lines 1-5) and shaping the bumps into a planar shape by a coining process (Abstract, lines 7-10). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the leveling disclosed by

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Ichihara and Michael to include reflowing the solder to form hemispherical shapes and coining, as taught by Kyo, because it is an alternative method to ensure uniform bump heights.

Regarding claim 6, the arguments analogous to those presented above for claim 3 are applicable to claim 6.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Pat. No. 5,969,461 to Anderson et al. For surface acoustic wave device;

U.S. Pat. No. 5,058,178 to Ray for inspection of specular, 3-D features;

U.S. Pat. No. 5,489,750 to Sakemi et al. For mounting an electronic part with bumps on a circuit board;

U.S. Pat. No. 5,761,337 to Nishimura et al. For inspection of the appearance of bumps;
and

JP Pat. No. 04-56246 to Nakaoka et al. For semiconductor manufacturing device; and

U.S. Pat. No. 5,864,778 to Morcom et al. for measuring and calculating geometrical parameters of an object.

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Contact Information

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Virginia M Kibler whose telephone number is (703) 306-4072. The examiner can normally be reached on Mon. Thurs. 8:00 - 5:30 and every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au, can be reached on (703) 308-6604. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9314 for regular communications and (703) 872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 306-0377.

VR

VK

8/20/03

MEHRDAD DASTOURI
PRIMARY EXAMINER
Mehrdad Dastouri